

1. Solve the system by addition:  $\begin{cases} 3x - 2y = 6 \\ 2x + 4y = 20 \end{cases}$
2. Solve the system using the substitution method:  $\begin{cases} 7x - y = 24 \\ x = 2y + 9 \end{cases}$
3. Solve the system by graphing:  $\begin{cases} 2x - y \geq 4 \\ y > 1 \end{cases}$

The solution is:

4. a) If  $y$  varies directly as  $x$ , find the constant of variation and the direct variation equation for this situation:  $y = 26$ , when  $x = 2$ .
- b) If  $y$  varies inversely as  $x$ , find the constant of variation and the direct variation equation for this situation:  $y = 5$  when  $x = 4$ .

Graph the solution on a real number line and write the solution in interval notation.

5.  $|x - 1| + 4 < 5$
6.  $|2x - 4| \geq 8$
7. Solve for  $x$ :  $|3x - 1| - 5 = 3$
8. Using function notation, write the equation of the line with slope of 2, which passes through P (1, 3).
9. Using function notation, write the equation of the line with a  $y$  intercept point of (0, 2) and is perpendicular to  $\frac{1}{3}x + y = 5$ .

In 10 and 11, simplify each expression. Write answers without using negative exponents.

$$10. \left( \frac{-x^3}{27y^{-6}} \right)^{\frac{2}{3}} \qquad 11. 64^{\frac{-1}{2}}$$

In 12-15, simplify each expression. Assume that all variables represent positive real numbers. Add or subtract like terms where indicated.

$$12. \sqrt{49x^6y^{16}z^4} \qquad 13. \frac{\sqrt[3]{48x^8y^{14}}}{\sqrt[3]{2x^2y^2}} \qquad 14. \sqrt{27} - \sqrt{48} \qquad 15. \sqrt[3]{32x^4} + 6x \sqrt[3]{4x}$$

In 16-18, multiply or divide as indicated. Rationalize all denominators.

16.  $(4\sqrt{3} - 3\sqrt{2})(5\sqrt{3} + 3\sqrt{2})$       17.  $\frac{\sqrt{5}-1}{\sqrt{5}+1}$       18.  $\sqrt{\frac{16}{3}}$

In 19-20, solve and check each solution.

19.  $\sqrt{2x+1} + 5 = 8$       20.  $\sqrt[3]{4-2x} = 2$

21. Find the distance between the point (-5,8) and the point (1, 16).

22. Graph the following radical function and list its domain and range. Label at least 3 exact points on your graph.  $f(x) = \sqrt{x+1}$

23. Solve by completing the square:  $x^2 - 4x - 1 = 0$

24. Solve using the quadratic formula:  $x^2 - 6x = -6$

In 25-27, perform the indicated operations. Give all answers in a + bi form.

25.  $(6 - \sqrt{-36}) - (4 + \sqrt{-49})$       26.  $(5 - 3i)(4 - 2i)$       27.  $\frac{2-i}{3+i}$

28. Graph the given quadratic function. Label the vertex, axis of symmetry and 2 other exact points. List domain and range.

(a)  $f(x) = x^2 - 2x - 3$       (b)  $f(x) = -(x+3)^2 + 1$

29. Graph the function  $f(x) = \log_4 x$ . Label 3 exact points. List domain and range.

30. Graph the function  $f(x) = 3^x$ . Label 3 exact points. List domain and range.

In 31-33, solve for x.

31.  $\log_x 81 = 4$       32.  $\log_{10} 100 = x$       33.  $\log_2 x = 4$

34. Write the expression  $\log a^6 b^2 c$  in terms of the logarithms of a, b and c.

35. Write the expression  $\frac{1}{3} \ln a + 7 \ln b - \ln c$  as a logarithm of a single quantity.

36. Use the change of base formula to find  $\log_4 5$  to four decimal places.

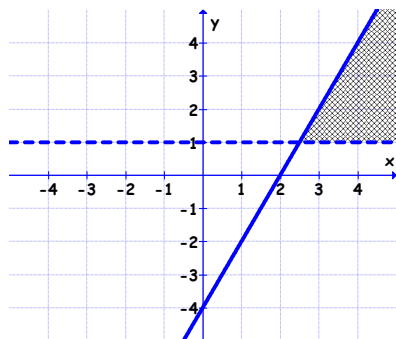
37. Sketch a graph of the circle  $(x-3)^2 + (y-1)^2 = 4$ . Label 4 exact points.

38. On the same set of axes graph the one-to one function,  $f(x) = -\frac{1}{4}x + 1$  and its inverse.

Write the equation of  $f^{-1}$ .

Answers:

1.  $(4, 3)$
2.  $(3, -3)$
3. Point  $(4, 2)$ ; Answer may vary.



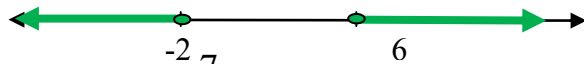
4. a)  $k = 13$ ;  $y = 13x$

b)  $k = 20$ ;  $y = \frac{20}{x}$

5.  $\{x/x < 2, x > 0\}$  or  $(0, 2)$



6.  $\{x/x \leq -2, x \geq 6\}$  or  $(-\infty, -2] \cup [6, \infty)$



7.  $x = 3, x = -\frac{7}{3}$

8.  $f(x) = 2x + 1$

9.  $f(x) = 3x + 2$

10.  $\frac{x^2 y^4}{9}$

11.  $\frac{1}{8}$

12.  $7x^3 y^8 z^2$

13.  $2x^2 y^4 \sqrt[3]{3}$

14.  $-\sqrt{3}$

15.  $8x \sqrt[3]{4x}$

16.  $42 - 3\sqrt{6}$

17.  $\frac{3}{2} - \frac{\sqrt{5}}{2}$

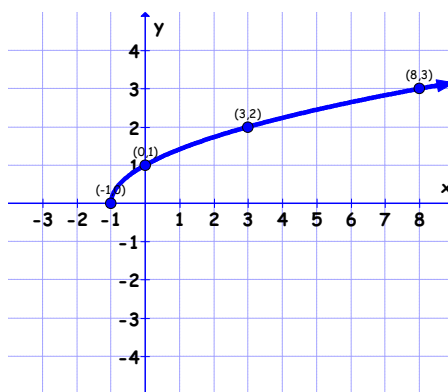
18.  $\frac{4\sqrt{3}}{3}$

19.  $x = 4$

20.  $x = -2$

21. 10 units

22. Domain:  $[-1, \infty)$ ; Range:  $[0, \infty)$



23.  $x = 2 \pm \sqrt{5}$

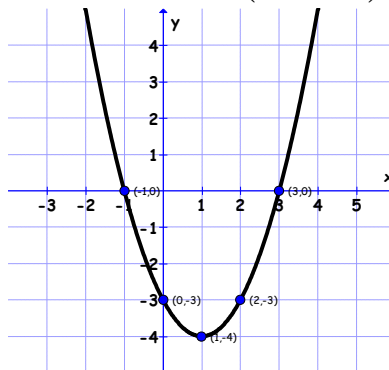
24.  $3 \pm \sqrt{3}$

25.  $2 - 13i$

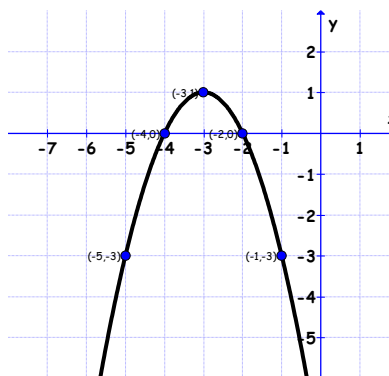
26.  $14 - 22i$

27.  $\frac{1}{2} - \frac{1}{2}i$

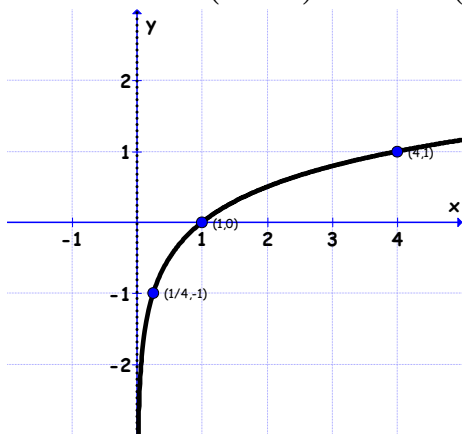
28. a) Domain:  $(-\infty, +\infty)$ ; Range:  $[-4, \infty)$



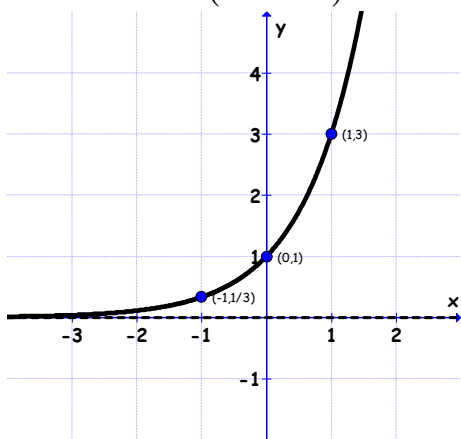
b) Domain:  $(-\infty, +\infty)$ ; Range:  $(-\infty, 1]$



29. Domain:  $(0, +\infty)$ ; Range:  $(-\infty, \infty)$



30. Domain:  $(-\infty, +\infty)$ ; Range:  $(0, \infty)$



31.  $x = 3$

32.  $x = 2$

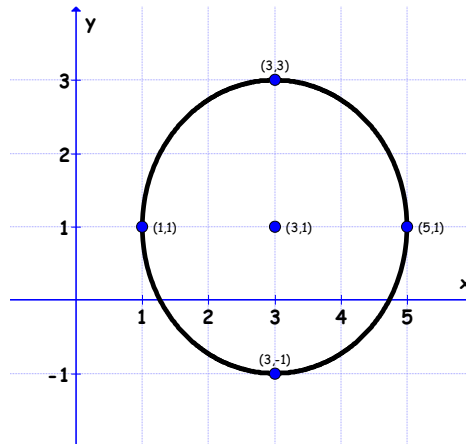
33.  $x = 16$

34.  $6\log a + 2\log b + \log c$

35.  $\ln \frac{\sqrt[3]{a} b^7}{c}$

36. 1.1610

37.



38.

